What is claimed is:

1. A device for engaging a body lumen, comprising:

a first layer comprising an electroactive polymer and coupled to a second layer; and

the second layer having a length sufficient to at least partially encircle a body lumen and a stiffness greater than that of the first layer.

2. The device according to claim 1 wherein the electroactive polymer is a dielectric electostrictive electroactive polymer.

3. The device according to claim 2 wherein the electroactive polymer comprises a polymer selected from the group consisting of: silicone, latex, styrene, co-polymers of styrene, styrene butadiene styrene, isoprene and acrylate.

4. The device according to claim 1 wherein the electroactive polymer is an ion-exchange polymer metal composite.

5. The device according to claim 4 wherein the ion-exchange polymer metal composite comprises ionomers selected from the group consisting of: perfluorosulfate, perfluorocarboxylate, polyvinylidene fluoride and combinations thereof.

6. The device according to claim 4 wherein the ion-exchange polymer metal composite comprises electrode material selected from the group consisting of: conductive carbon, graphite, platinum, gold, silver and combinations thereof.

7. The device according to claim 1 wherein the electroactive polymer has an anode surface, a cathode surface and an elastomer material separating the anode surface from the cathode surface.

8. The device according to claim 7 further comprising an insulating layer disposed adjacent the anode surface such that the anode surface is between the insulating layer and the elastomer material.

9. The device according to claim 7 further comprising an insulating layer

disposed adjacent the cathode surface such that the cathode surface is between the insulating layer and the elastomer material.

10. The device according to claim 7 wherein the anode and cathode conductivity is about 750 ohms to 1mega-ohm.

11. The device according to claim 7 wherein the elastomer material separating the anode surface from the cathode surface dielectric strength is about 1kV to 10kV per mil.

12. The device according to claim 7 wherein the elastomer material separating the anode surface from the cathode surface hardness is about 3A to 75A durometer.

13. The device according to claim 7 wherein the elastomer material separating the anode surface from the cathode surface tensile strength is about 2 to 75 MPa.

14. The device according to claim 1 wherein the first layer is attached to the second layer forming a second layer attached portion and a second layer unattached portion wherein during activation of the first layer the first layer unattached portion is separated from the second layer.

15. The device according to claim 1 wherein the first layer is attached to the second layer forming a first layer attached portion and a first layer unattached portion wherein during first layer activation the first layer remains attached to the second layer at a single attachment point.

16. The device according to claim 1 wherein the body lumen is selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostals arteries, a set of intercostals veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

17. The device according to claim 1 wherein the second layer is shaped to fully or partially encircle a body lumen.

18. The device according to claim 1 wherein the second layer is "C" shaped.

19. The device according to claim 18 further comprising a strap having a first end and a second end is attached to the second layer across the open portion of the "C" shape.

20. The device according to claim 19 wherein the first end of the strap is attached to the second layer.

21. The device according to claim 20 wherein the second end of the strap and a portion of the second layer form cooperating portions of a mating fastener.

22. The device according to claim 21 wherein the cooperating portions of the mating fastener is selected from the group consisting of: the mating fasteners are magnets; the mating fasteners have one mating fastener that is a magnet and the other mating fastener is formed from a magnetically attractive material; the mating fasteners are opposite sides of a buckle; the mating fasteners are a screw and a screw-receiving opening; the mating fasteners are a hook and a loop; the mating fasteners comprise a plurality of hooks and a plurality of loops; the mating fasteners include a locking ring and a mating element;

and the mating fasteners include a positive-lock set.

23. The device according to claim 1 further comprising a third layer coupled to the first layer.

24. The device of claim 23, wherein the third layer is a vascular graft.

25. The device of claim 24, wherein the vascular graft is made from a polymer selected from the group consisting of: polyester, nylon, polytetrafluoroethylene and polyvinylidene fluoride.

26. The device according to claim 1 wherein a portion of the device is coated with a tissue growth inducing polymeric material.

27. The device according to claim 26 wherein the tissue growth inducing material is one of poly-L-lysine and poly-D-lysine.

28. The device of claim 1 wherein the second layer further comprises a reinforcement element configured to maintain the length and width of the second layer.

29. The device of claim 28 wherein the reinforcement element is fabricated from at least one if polyester, nylon, para-amid fiber, stainless steel, platinum, syorelastic nitinol and alloys of nickel and titanium.

30. The device of claim 1 wherein the length of the second layer is sufficient for the second layer to completely encircle a portion of a body lumen.

31. The device of claim 30 the second layer further comprising a first end and a second end wherein when the second layer is configured to completely encircle a portion of a body lumen, the second layer first end and the second end overlap.

32. The device of claim 31 further comprising a mating fastener disposed within the portion of the second layer where the first end and the second end overlap.

33. The device of claim 32, wherein the first end and the second end include cooperating portions of a mating fastener.

34. The device of claim 32, wherein the first end and the second end are configured to be sewn together.

35. The device of claim 32, wherein the mating fasteners are magnets.

36. The device of claim 32, wherein at least one of the mating fasteners is magnetic.

37. The device of claim 36, wherein a one the mating fasteners is a magnet and the other mating fastener is formed from a magnetically attractive material.

38. The device of claim 32, wherein the mating fasteners are opposite sides of a buckle.

39. The device of claim 32, wherein the mating fasteners are a screw and a screw-receiving opening.

40. The device of claim 32, wherein the mating fasteners are a hook and a loop.

41. The device of claim 40, wherein the mating fasteners comprise a plurality of hooks and a plurality of loops.

42. The device of claim 32, wherein the mating fasteners include a locking ring and a mating element.

43. The device of claim 32 wherein the mating fasteners include a positive-lock.

44. The device according to claim 31 wherein the portion of the body lumen is selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostals arteries, a set of intercostals veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

45. The device of claim 1 wherein the second layer further comprising a first end and a second end, wherein each of the first end and the second end have at least two tabs, each of the tabs in the at least two tabs has a width wherein the sum of the widths of all the tabs in the at least two tabs on the first end is less than the width of the device.

46. The device of claim 45, wherein the at least two tabs on the first and second ends are configured to be removably coupled such that the device is reconfigurable between a first configuration in which the at least two tabs on the first and second ends are separate and a second configuration in which the at least two tabs on the first and second ends are coupled.

47. The device of claim 45 wherein a tab spacing profile is provided between adjacent tabs in the at least two tabs, the tab spacing profile having a width wherein the sum of the tab spacing profile widths and the widths of all of the tabs in the at least two tabs equals the width of the device.

48. The device of claim 47 wherein the tab spacing profile between each of the tabs in the at least two tabs is the same.

49. The device according to claim 1 further comprising a sensor for detecting a signal representing cardiac rhythm and a controller to actuate the electroactive polymer layer in response to the signal.

50. A system for compressing a lumen, comprising:

a cuff having an expandable layer and a cover layer, the cover layer coupled to the expandable layer defining a cavity there between, the cavity having a volume, the cover layer defining an opening in fluid communication with the cavity; and

an electroactive polymer pump having an output in communication with the opening, wherein, the electroactive polymer pump moves a fluid to expand the expandable layer in synchronization with a portion of a cardiac cycle.

51. The system according to claim 50 further comprising a sensor for sensing a signal related to the cardiac cycle and a controller wherein the controller actuates the electroactive polymer pump in response to the signal related to the cardiac cycle.

52. The system according to claim 51 wherein the cuff, the electroactive polymer pump, the sensor, the power source and the controller are all implantable within a body.

53. The system according claim 51 wherein the cuff, the electroactive polymer pump, the sensor, induction coil, power source and the controller are all implantable within a body.

54. The system according claim 51 wherein the cuff, the electroactive polymer pump, the sensor, induction coil and the controller are all implantable within a body.

55. The system according to claim 51 herein the controller actuation results in copulsation of a portion of the cardiac cycle.

56. The system according to claim 51 wherein the controller actuation results in counterpulsation of a portion of the cardiac cycle.

57. The system of claim 50, the cover layer further comprising a first end and a second end the ends having a pair of mating fasteners selected from the group consisting of: the mating fasteners are magnets; the mating fasteners have one mating fastener that is a magnet and the other mating fastener is formed from a magnetically attractive material; the mating fasteners are opposite sides of a buckle; the mating fasteners are a screw and a screw-receiving opening; the mating fasteners are a hook and a loop; the mating fasteners comprise a plurality of hooks and a plurality of loops; the mating fasteners include a locking ring and a mating element; and the mating fasteners include a positive-lock set.

58. The system according to claim 50 wherein the cuff is sized to partially encircle a lumen selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostal arteries, a set of intercostal veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

59. The system according to claim 50 wherein the cuff is sized to completely encircle a lumen selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostal arteries, a set of intercostal veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

60. A device for compressing a lumen in a body comprising:

a cuff having a complaint layer and a semi-compliant layer coupled to the compliant layer so as to form a cavity there between; and
an electroactive polymer pump in communication with the cavity.

61. A device according to claim 60 wherein the electroactive polymer pump further comprises an electroactive polymer covering a chamber wherein actuation of the electroactive polymer causes the volume of the chamber to change.

62. The device of claim 61 wherein the electroactive polymer pump has a single chamber.

63. The device of claim 61 wherein the electroactive polymer pump has more than one chamber.

64 The device of claim 62 or 63 having a positive bias.

65. The device of claim 62 or 63 having a negative bias.

66. The device of claim 62 or 63 having a mechanical bias.

67. The device of claim 62 or 63 having a pressure differential bias.

68. The device according to claim 63 wherein each one of the more than one chamber is connected serially to at least one of another of each one of the more than one chamber.

69. The device according to claim 63 wherein each one of the more than one chamber is connected in parallel to at least one of another of each one of the more than one chamber.

70. The device according to claim 63 wherein each one of the more than one chamber is connected to another one of the more than one chamber using a combination of parallel and serial connections.

71. The device of claim 63 wherein the chambers in the more than one chamber are connected in line.

72. The device of claim 71 wherein the electroactive polymer pump has a single output port.

73. The device of claim 63, the electroactive polymer pump further comprising:

an inlet port;

an outlet port; and

a check valve between adjacent chambers of the more than one chamber.

74. The device of claim 61 the electroactive polymer pump comprising a plurality of chambers arranged in a planar array having more than one horizontal row, and a plurality of fluid channels connecting the plurality of chambers wherein at least one chamber is connected via a fluid channel to another chamber in a different horizontal row.

75. The device of claim 73 having a single port.

76. The device of claim 71, 72 or 73 arranged into an array.

77. The device of claim 76 wherein the chambers are fluidly coupled vertically.

78. The device of claim 76 wherein the chambers are fluidly coupled horizontally.

79. The device of claim 60 wherein the electroactive polymer pump is a rolled electroactive polymer pump.

80. The device of claim 79 the rolled electroactive polymer pump defining an interior volume in communication with the fluid wherein activation of the rolled electroactive polymer pump forces the fluid into the cavity.

81. The device of claim 79 wherein the rolled electroactive polymer pump is coupled to a drive member so that activation of the rolled electroactive polymer pump moves the drive member wherein movement of the drive member forces the fluid into the cavity.

82. The device of claim 81 wherein the rolled electroactive polymer is a multiple stage electroactive polymer.

83. The device of claim 60 wherein the electroactive polymer pump utilizes efficient polymer actuation configurations.

84. The device of claim 83 herein activation of the electroactive polymer pump utilizing efficient polymer actuation configurations drives a piston that forces fluid into the cavity.

85. The device of claim 60 further comprising a controller configured to receive a signal associated with the cardiac cycle of a heart and generate an actuation signal for the electroactive polymer pump in response thereto.

86. A method for augmenting flow in a body lumen comprising:
detecting a cardiac cycle trigger;
pumping a fluid through the actuation of an electroactive polymer;
deforming at least a portion of a body lumen in response to the cardiac cycle using the pumped fluid.

87. A method for augmenting flow in a body lumen according to claim 86 wherein deforming a portion of a body lumen is performed by porting the pumped fluid into a deformable cuff to deform at least a portion of a body lumen.

88. A method for augmenting flow in a body lumen according to claim 86 wherein the cardiac trigger is related to an ECG of a human.

89. A method for augmenting flow in a body lumen according to claim 86 wherein the first cardiac trigger is related to the increasing portion of the R-wave.

90. A method for augmenting flow in a body lumen according to claim 89 wherein the first cardiac trigger occurs at 90% of the increasing R-wave amplitude.

91. A method for augmenting flow in a body lumen according to claim 86 wherein the actuation of the electroactive polymer causes the deforming at least a portion of a body lumen to coincide with the ventricular systole.

92. A method for augmenting flow in a body lumen according to claim 86 wherein the cardiac cycle trigger is related to aortic pressure.

93. A method for augmenting flow in a body lumen according to claim 86 wherein the actuation of the electroactive polymer causes the deforming at least a portion of a body lumen to augment flow in a copulsation mode.

94. A method for augmenting flow in a body lumen according to claim 86 wherein the deforming at least a portion of a body lumen occurs during the ventricular systole of the heart.

95. A method for augmenting flow in a body lumen according to claim 86 wherein the cardiac trigger is related to the Q-T interval.

96. A method for augmenting flow in a body lumen according to claim 86 wherein the first cardiac trigger is related to the decreasing portion of the T-wave.

97. A method for augmenting flow in a body lumen according to claim 86 wherein the first cardiac trigger occurs at the end of the T-wave.

98. A method for augmenting flow in a body lumen according to claim 86 wherein the cardiac trigger is related to the T-wave and selected so that deformation of at least a portion of a body lumen coincides with the ventricular diastole.

99. A method for augmenting flow in a body lumen according to claim 86 wherein the body lumen is a blood vessel selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostal arteries, a set of intercostal veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

100. A method for augmenting blood flow in a vessel comprising:

enlarging a cavity formed between a first layer and a second layer by activating an electroactive polymer;

deforming the first layer in response to enlarging the cavity; and

deforming the walls of a vessel adjacent the first layer in response to the deforming of the first layer.

101. A method for augmenting blood flow in a vessel according to claim 100 wherein the deforming the walls of a vessel adjacent the first layer coincides with a portion of a cardiac cycle.

102. A method for augmenting blood flow in a vessel according to claim 100 wherein increasing the pressure in the cavity results in deforming the first layer so as to constrict the vessel.

103. A method for augmenting blood flow in a vessel according to claim 100 wherein increasing the pressure in the cavity constricts the vessel.

104. A method for augmenting blood flow in a vessel according to claim 100 wherein activating an electroactive polymer coincides with a portion of the cardiac cycle.

105. A method for augmenting blood flow in a vessel according to claim 100 wherein deforming the walls of a vessel adjacent the first layer is related to the ECG of the patient.

106. A method for augmenting blood flow in a vessel according to claim 100 wherein deforming the walls of a vessel adjacent the first layer is related to the increasing portion of the R-wave.

107. A method for augmenting blood flow in a vessel according to claim 100 wherein deforming the walls of a vessel adjacent the first layer coincides with the ventricular systole.

108. A method for augmenting blood flow in a vessel according to claim 100 wherein deforming the walls of a vessel adjacent the first layer is related to a change in aortic pressure.

109. A method for augmenting blood flow in a vessel according to claim 100 wherein deforming the walls of a vessel adjacent the first layer is selected such that the blood flow in the vessel is augmented in a copulsation mode.

110. A method for augmenting blood flow in a vessel according to claim 100 wherein activating the electroactive polymer occurs so that the cavity is enlarging during the ventricular systole of the heart.

111. A method for augmenting blood flow in a vessel according to claim 100 further comprising the activating the electroactive polymer is response to a signal associated with a cardiac signal.

112. A method for augmenting blood flow in a vessel according to claim 111 wherein the signal associated with the cardiac cycle is related to the Q-T interval.

113. A method for augmenting blood flow in a vessel according to claim 111 wherein the signal associated with the cardiac cycle is related to the decreasing portion of the T-wave.

114. A method for augmenting blood flow in a vessel according to claim 111 wherein the signal associated with the cardiac cycle occurs at the end of the T-wave.

115. A method for augmenting blood flow in a vessel according to claim 111 wherein the signal associated with the cardiac cycle is related to the T-wave and selected so deforming the walls of a vessel adjacent the first layer coincides with the ventricular diastole.

116. A method for augmenting blood flow in a vessel according to claim 111 wherein the signal is selected such that the blood flow in the vessel is augmented in a counterpulsation mode.

117. A system for compressing a lumen in a body, comprising:

a cuff having a compliant layer and a semi-compliant layer coupled to the compliant layer to form a cavity there between;

an electroactive polymer diaphragm pump having an output; and

a conduit connecting the output and the cavity, wherein activation of the

electroactive polymer diaphragm pump expands the compliant layer.

118. The system according to claim 117 wherein the cuff is sufficiently long to completely encircle a lumen selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostals arteries, a set of intercostals veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

119. The system according the claim 117 wherein the compliant layer is fabricated with a first material and the semi-compliant layer is fabricated with a second material.

120. The system of claim 119, wherein the first material is a first silicone elastomer and the second material is a second silicone elastomer.

121. The system of claim 120, wherein the first silicone elastomer is a 5-50 A silicone elastomer having a minimum of 500% elongation.

122. The system of claim 120, wherein the second silicone elastomer is a 65-95 A silicone elastomer having less than a 400% elongation.

123. The system according to claim 117 wherein the electroactive polymer pump is a single chamber pump.

124. The system according to claim 117 wherein the electroactive polymer pump is a multi-chamber pump.

125. The system according to claim 123 or 124 wherein the electroactive polymer pump has a negative bias.

126. The system according to claims 123 or 124 wherein the electroactive polymer pump has a positive bias.

127. The system according to claim 117 further comprising a sensor for detecting a cardiac signal and a controller for activating the electroactive polymer pump in response to the cardiac signal.

128. A device for compressing a lumen in a body comprising:

a cuff having a compliant layer and a semi-compliant layer and a cavity formed between the compliant layer and the semi-compliant layer;

a deformable fluid reservoir containing a fluid;

a conduit coupling the fluid reservoir to the cavity; and

an electroactive polymer layer including a first electrode, a second electrode and a polymer layer disposed between the first electrode and the second electrode, wherein activation of the electroactive polymer layer deforms the deformable fluid reservoir to urge the fluid into the cavity.

129. The device of claim 128 wherein the activation of the electroactive polymer layer urges fluid into the cavity with sufficient force to deform the compliant layer.

130. The device of claim 128 wherein the electroactive polymer layer partially encircles the deformable fluid reservoir.

131. The device of claim 128 wherein the electroactive polymer layer and the deformable fluid reservoir have the same shape.

132. The device of claim 131 wherein the electroactive polymer layer substantially encompasses the deformable fluid reservoir.

133. The device of claim 128 wherein the shape is spherical.

134. A system, comprising:
an electroactive polymer pump;
controller configured to receive a signal associated with the cardiac cycle of a heart and actuate the electroactive polymer pump in response thereto;
a cuff comprising,
a compliant first layer configured to engage internal vasculature; and

a second layer coupled to the first layer and having a stiffness greater than a stiffness of the first layer and having an opening formed therein;

the compliant first layer and the second layer being coupled to form a cavity bounded by the first layer and the second layer, the cavity being in communication with the opening in the second layer; and

a conduit coupled between the opening and the electroactive polymer pump, wherein actuation of the electroactive polymer pump moves a fluid into the cavity and deforms the first layer.

135. The system of claim 134 wherein the signal associated with the cardiac cycle is related to systole.

136. The system of claim 134 wherein the signal associated with the cardiac cycle is related to diastole.

137. The system of claim 134 wherein the signal associated with the cardiac cycle is related to a change in aortic pressure.

138. The system of claim 134 wherein the signal associated with the cardiac cycle is related to a change in arterial pressure.

139. The system of claim 134 wherein the signal associated with the cardiac cycle is related to a change in venous pressure.

140. The system of claim 134 wherein the electroactive polymer pump is a dielectric electostrictive electroactive polymer pump or an ion-exchange polymer metal electroactive polymer pump.

141. The system of claim 134 wherein the electroactive polymer pump is a rolled electroactive polymer pump.

142. The system of claim 134 wherein the electroactive polymer pump is a diaphragm pump.

143. The system of claim 134 wherein the electroactive polymer pump is a multi-chamber diaphragm pump.

144. The device according to claim 134, the electroactive polymer pump comprising an anode and a cathode wherein the anode and cathode conductivity is about 750 ohms to 1mega-ohm.

145. The device according to claim 134, the electroactive polymer pump comprising an anode and a cathode wherein an elastomer material separating an anode surface from a cathode surface has a dielectric strength of about 1kV to 10kV per mil.

146. The device according to claim 134, the electroactive polymer pump comprising an anode and a cathode wherein an elastomer material separating an anode surface from a cathode surface has a hardness of about 3A to 75A durometer.

147. The device according to claim 134, the electroactive polymer pump comprising an anode and a cathode wherein an elastomer material separating an anode surface from a cathode surface has a tensile strength of about 2 to 75 MPa.

148. A system for compressing a blood vessel, comprising:

a cuff having an expandable layer and a cover layer, the cover layer coupled to the expandable layer defining a cavity there between; and

a rolled electroactive polymer pump configured to move a fluid into the cavity to expand the expandable layer in synchronization with a portion of a cardiac cycle.

149. The system according to claim 148 further comprising a sensor for sensing a signal related to the cardiac cycle and a controller wherein the controller actuates the roller electroactive polymer pump in response to the signal related to the cardiac cycle.

150. The system according to claim 149 wherein the cuff, the rolled electroactive polymer pump, the sensor and the controller are all implantable within a body.

151. The system according to claim 149 wherein the controller actuation results in copulsation of a portion of the cardiac cycle.

152. The system according to claim 149 wherein the controller actuation results in counterpulsation of a portion of the cardiac cycle.

153. The system of claim 148, the cover layer further comprising a first end and a second end the ends having a pair of mating fasteners selected from the group consisting of: the mating fasteners are magnets; the mating fasteners have one mating fastener that is a magnet and the other mating fastener is formed from a magnetically attractive material; the mating fasteners are opposite sides of a buckle; the mating fasteners are a screw and a screw-receiving opening; the mating fasteners are a hook and a loop; the mating fasteners comprise a plurality of hooks and a plurality of loops; the mating fasteners include a locking ring and a mating element; and the mating fasteners include a positive-lock set.

154. The system according to claim 148 wherein the cuff is sized to partially encircle a blood vessel selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostal arteries, a set of intercostal veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.1

155. The system according to claim 148 wherein the cuff is sized to completely encircle a blood vessel selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostal arteries, a set of intercostal veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

156. The system according to claim 148 arranged within a human body such that expansion of the expandable layer compresses a portion of a blood vessel, the blood vessel selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostal arteries, a set of intercostal veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

157. The system according to claim 148 further comprising a shaft coupled to the rolled electroactive polymer pump wherein actuation of the rolled electroactive polymer pump deflects the shaft.

158. The system according to claim 157 wherein the deflection of the shaft drives a piston to move fluid into the cavity.

159. The system according to claim 148 further comprising a cavity formed within the rolled electroactive polymer pump in communication with the cavity defined by the first layer and the second layer.

160. The system according to claim 159 wherein actuation of the rolled electroactive polymer pump compresses the cavity within the rolled electroactive polymer pump and moves fluid into the cavity defined by the first layer and the second layer.

161. A system for compressing a blood vessel, comprising:

a pair of lever arms coupled at a pivot point; and

a rolled electroactive polymer coupled to an output shaft wherein actuation of the rolled electroactive polymer moves the output shaft; and wherein one of the lever arms is attached to the output shaft.

162. The system according to claim 161 wherein actuation of the rolled electroactive polymer causes a portion of the lever arms to move apart.

163. The system according to claim 161 wherein actuation of the rolled electroactive polymer causes a portion of the lever arms to move together.

164. The system according to claim 161 wherein the lever arms are sized to compress a blood vessel selected from the group consisting of: the ascending aorta, the descending aorta, a set of intercostal arteries, a set of intercostal veins, the superior vena cava, the inferior vena cava, the pulmonary vein and the pulmonary artery.

165. The system according to claim 161 wherein when the lever arm partially

encircles a blood vessel actuation of the rolled electroactive polymer compresses the blood vessel between the lever arms.

166. The system according to claim 161 wherein when the lever arms are disposed about a blood vessel the blood vessel is positioned between the pivot point and the output shaft.

167. The system according to claim 161 wherein when the lever arms are disposed about a blood vessel the pivot point is positioned between blood vessel and the output shaft.

168. The system according to claim 161 further comprising a first pair of lever arms coupled at a first pivot point; and a first rolled electroactive polymer coupled to a first output shaft wherein actuation of the first rolled electroactive polymer moves the first output shaft; and wherein one of the lever arms in the first pair of lever arms is attached to the first output shaft and a second pair of lever arms coupled at a second pivot point; and a second rolled electroactive polymer coupled to a second output shaft wherein actuation of the second rolled electroactive polymer moves the second output shaft; and wherein one of the lever arms in the second pair of lever arms is attached to the second output shaft, wherein the pair of lever arms, the first pair of lever arms and the third pair of lever arms are disposed about a blood vessel such that actuation of the rolled electroactive polymer, the second rolled electroactive polymer and the second rolled electroactive polymer compresses the blood vessel.

169. The system according to claim 168 wherein the rolled electroactive polymer, the second electroactive polymer and the third electroactive polymer are actuated simultaneously to compress a blood vessel.

170. The system according to claim 168 wherein the rolled electroactive polymer, the second electroactive polymer and the third electroactive polymer are actuated sequentially to compress a blood vessel.

171. A device for compressing a blood vessel, comprising:

a first layer comprising an electroactive polymer and coupled to a second layer;

the second layer having a length sufficient to at least partially encircle a body lumen and a stiffness greater than that of the first layer;

a cavity formed between the first layer and the second layer; and

a bias element disposed within the cavity and configured to expand the electroactive polymer when the electroactive polymer is in an non-actuated state.

172. The device according to claim 171 wherein the bias element is a foam material.

173. The device according to claim 171 wherein the bias element is a spring.

174. The device according to claim 171 wherein the bias element comprises a fluid.

175. A device for compressing a blood vessel in a body, comprising:

a deformable bladder containing a fluid;

a cuff having an expandable layer and a cover layer, the cover layer coupled to the expandable layer to define a cavity there between; and

a "C" ring electroactive polymer actuator disposed about the bladder such that actuation of the electroactive polymer actuator deforms the bladder and forces fluid into the cavity.

176. A device for compressing a blood vessel in a body according to claim 175 further comprising a plurality of "C" ring electroactive polymer actuators.

177. A device for compressing a blood vessel in a body according to claim 176 wherein the plurality of "C" ring electroactive polymer actuators are actuated serially.

178. A device for compressing a blood vessel in a body according to claim 176

wherein the plurality of "C" ring electroactive polymer actuators are actuated simultaneously.

179. A device for compressing a blood vessel in a body according to claim 176 wherein the plurality of "C" ring electroactive polymer actuators are actuated sequentially.

180. A device for compressing a blood vessel in a body according to claim 175 wherein the "C" ring electroactive polymer actuator is actuated in response to a cardiac signal.

181. A device for compressing a blood vessel in a body according to claim 175 wherein the "C" ring electroactive polymer actuator is actuated in response to a signal.

182. A method for augmenting blood flow in a body, comprising:

sensing the R wave of the ECG of the body;

computing the QT interval to the end of the T wave; and

actuating an electroactive polymer based vascular assist system in relation to the T wave.

183. A method for augmenting blood flow in a body according to claim 182 wherein the actuation of an electroactive polymer system augments blood flow in a counterpulsation mode.

184. A method for augmenting blood flow in a body according to claim 182 wherein the actuation of the electroactive polymer system augments blood flow during diastole.

185. A method for augmenting blood flow in a body according to claim 182 wherein the actuation of an electroactive polymer system augments blood flow in a co-pulsation mode.

186. A method for augmenting blood flow in a body according to claim 182

wherein the actuation of the electroactive polymer system augments blood flow during systole.

187. A method for augmenting blood flow in a body according to claim 182 wherein actuating the electroactive polymer based system augments blood flow by using electroactive polymer actuation to pump a fluid into an expanding wall cuff disposed about a body lumen.

188. A method for augmenting blood flow in a body according to claim 182 wherein actuating the electroactive polymer based system augments blood flow by using electroactive polymer actuation to compress a body lumen.

189. A method for augmenting blood flow in a body according to claim 182 wherein actuating the electroactive polymer based system augments blood flow by using electroactive polymer actuation to compress a deformable bladder.

190. A method for augmenting blood flow in a body, comprising:

sensing a pressure wave related to a hemodynamic pressure in the body; and

based on a portion of the pressure wave, actuating an electroactive polymer based system to augment blood flow in the body.

191. A method for augmenting blood flow in a body according to claim 190 wherein the pressure in the body is venous pressure.

192. A method for augmenting blood flow in a body according to claim 190 wherein the pressure in the body is arterial pressure.

193. A method for augmenting blood flow in a body according to claim 190 wherein actuating the electroactive polymer based system augments blood flow by using electroactive polymer actuation to pump a fluid into an expanding wall cuff disposed about a body lumen.

194. A method for augmenting blood flow in a body according to claim 190 wherein actuating the electroactive polymer based system augments blood

flow by using electroactive polymer actuation to compress a body lumen.

195. A method for augmenting blood flow in a body according to claim 190 wherein actuating the electroactive polymer based system augments blood flow by using electroactive polymer actuation to compress a deformable bladder.

196. A method of forming a stacked electroactive polymer actuator, comprising:

forming a plurality of adjacent electrodes on a single polymer layer; and

folding the polymer layer so that adjacent electrodes are stacked so that at least a single polymer layer exists between each adjacent electrode.

197. A system for augmenting blood flow, comprising:

a conventional vascular assist system selected from the group consisting of: an impeller driven left ventricle assist device, a solenoid driven vascular assist device and a total artificial heart, the conventional vascular assist system being modified to include an electroactive pump as the motive force for the movement of blood through the vascular assist device.